M.PHIL (CHEMISTRY : SEM -I)
PAPER- III- [Elective] ORGANIC CHEMISTRY

[50 marks] **[25 Hours]**

1. Spectroscopy methods [25marks]

1. Energy and the electromagnetic spectrum – Absorption of electromagnetic radiation by organic molecules-

   Infrared spectroscopy- Molecular vibrations – factors influencing vibrational frequencies- instrumentation – sampling techniques- applications of infrared spectroscopy – Indentify by finger printing- Identification of functional groups- Quantitative infrared analysis- Molar absorptivity- Attenuated Total Reflectance (ATR) and multiple internal reflectance (MIR) – Laser- Raman spectroscopy- Fourier transform infrared spectroscopy – IR spectroscopy problems.

2. NMR spectroscopy – N.M.R. phenomenon- theory of nuclear magnetic resonance- chemical shifts and its measurements- factors influencing chemical shift – correlation data for N.M.R. spectra- solvents used in N.M.R. – spin coupling- spin- spin splitting – coupling constants- factors influencing compling constant – proton exchange reactions – simplification of complex proton N.M.R. spectra.

3. C-13 NMR Spectroscopy- Natural Abudance of ^{13}C N.M.R. spectra- resolution- multiplicity-H De coupling Noise de coupling- Denterium coupling – NOE signal enhancement – off- resonance proton de coupling- structural applications of ^{13}C – NMR spectroscopy problems – H & ^{13}C – Electron spin resonance spectroscopy – Derivative curves – g values – Hyperfine splitting – ESR problems.

References:

1. Spectrometric identification of organic compounds – Robert M. Silverstain , G. Clayton Bassler and Torence C. Morril. (John Wiley and Sons)
2. Organic spectroscopy – William Kemp (ELBS).
3. Fundamentals of molecular spectroscopy

   - By C.N. Banwell (McGraw – Hill 1972)

4. Introduction to molecular spectroscopy

- By G.M. Barrow (McGraw – Hill)

2. Carbohydrates [25 marks] [20 Hours]

1. Mono saccharides – Reactions and confirmations – Ring structure of mono saccharides – Deoxy surgars – Muta rotation and mechanism of muta rotation - preparation of forms of a sugar – Glycosides – Hudson's lactone rule – Hudson's isorotation rule – methods for determining the size of sugar rings – pyranoses and furanose structure.
2. Conformational analysis of the mono saccharides – x- ray analysis – IR spectroscopy – NMR spectroscopy – Mass spectrometry – optical rotation and ORD curves – Anomeric effect – isopropylidene derivatives of mono saccharides – some sugar derivatives – Glycosylamines – Anhydro sugars – mono saccharide esters.

References :

1. I. L. Finar – Organic chemistry, Vol.: 2, Stereo chemistry and chemistry of natural products.
2. Chemistry of carbohydrates – By Pigment and Goepp (Academic Press)
3. Newer aspects of the stereochemistry of carbohydrates – By Ferrier and Overend